

Date: 10/11/11
Location: ACRC
Aircraft: Thor
Pilot: James Rosenthal
Flights: 3 Thor

Weather

Sunny, moderate southerly winds, temps around 75F.
METAR KANE 111750Z 18010KT 10SM SKC 22/13 A2987=

We took Thor to ACRC to gather data with and without faults using the baseline controller. We completed 3 flights, with numerous repeats. Winds were a factor, but we were able to complete the flight programs. Motor data was collected for all three flights. Onboard video was collected for flight 28. The new nav filter was running, but the old AHRS filter was used to provide attitude estimates. Note the saved IMU data contains the biases from the new nav filter and should be removed. (ie flight_data.p + flight_data.p_bias).

SIL simulation data is below under "Attachments".

The controller used for flights 26, 27, and 28 was the baseline controller.

Software used was [branches/flightcode_nav_rev_653](#)

Thor Flight 26: baseline controller, standard roll/pitch doublets.
(guidance/doublet_phi_theta.c) New nav filter running in background. R/C Rx:
A=516,L=140,F=6,H=0.

Thor Flight 27: baseline controller, fault injection sequence. (faults/fault_onesurf.c, guidance/doublet_phi3.c). Order of faults: 5 deg ramp, 10 deg ramp, 5 deg bias, 10 deg bias, then repeat. Went through this cycle nearly 4 times (10 deg bias only ran 3 times). Fault sequence is as follows:

t0: controller engaged, phi_ref = 0, theta_ref = 5 deg (holds this throughout)

t0 + 2s: 20 deg phi doublet (right, then left). 4 sec period

t0 + 6s: phi doublet complete

t0 + 8s: fault injection starts

t0 + 10s: 20 deg phi doublet (right, then left), 4 sec period

t0 + 16s: 20 deg phi doublet (right, then left), 4 sec period

t0 + 20s: phi_ref = 0; ramp faults at final value

Thor Flight 28: baseline controller, no faults, but same command sequence.
(guidance/doublet_phi3.c). 8 repeats.

Issues

1. GPS took a long time (10 min) to obtain lock. Not clear why this is happening. Need to install an external MPC5200B reset switch so the sensors can be left powered up while the flight computer is reset.

Flight Data Analysis

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